CLASS 136, BATTERIES: THERMOELECTRIC AND PHOTOELECTRIC

SECTION I - CLASS DEFINITION

This class is the generic class for primary, secondary, and thermal batteries. It includes the structure of the generator or battery itself, the elements thereof, the methods of preparation, operation, and details, and accessories not provided for in other classes.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

Pyromagnetic generators are found in Class 310, Electrical Generator or Motor Structure, subclass 306.

The application and use of the battery in combination with other devices should be searched for in the appropriate art classes.

For cells specialized for carrying out electrolytic chemical processes, see Class 204, Chemistry: Electrical and Wave Energy, subclass 242 and indented subclasses.

LINE WITH CLASS 252, CLASS 204, AND CLASS 429

See Class 252, Compositions, subclasses 500+ for electrically conductive compositions and electrical devices defined solely in terms of the composition of which they are composed such as electrodes not provided for in Class 136, Class 204, or Class 429.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

29, Metal Working, subclass 2 for battery-grid making; and subclasses 700+ for apparatus for the assembly of plural parts.

53, Package Making, appropriate subclasses for methods of and apparatus for encompassing or encasing goods or materials with a separate cover or band which serves as means for identifying, protecting or unit handling the goods or materials.

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes and non-coating apparatus for growing therein-defined single-crystal of all types of materials, including the subject matter of Class 136.

141, Fluent Material Handling, With Receiver or Receiver Coacting Means, subclass 1.1 for mechanical process, and subclasses 32+ for apparatus for filling battery grids and receptacles, and pasting the same.

164, Metal Founding, appropriate subclasses for processes of casting metal grids and subclass 109 for uniting spaced battery plates by metal casting.

252, Compositions, subclasses 500+ for electrically conductive compositions and electrical devices defined solely in terms of the composition of which they are composed such as electrodes. (See Lines With Other Classes and Within This Class, above.)

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes of molding or shaping plastic substances within the class definition.

320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for a method or apparatus for charging or discharging a voltaic battery or cell.

323, Electricity: Power Supply or Regulation Systems, subclasses 220 through 354 for systems for controlling the voltage or current in a single circuit.

324, Electricity: Measuring and Testing, subclasses 425+ for the testing of electrolyte properties.

340, Communications: Electrical, for electrical telemetering, signaling and alarm systems of general application. Note especially subclass 636 for such systems responsive to the condition of a battery.

403, Joints and Connections, appropriate subclasses for joints in general.

423, Chemistry of Inorganic Compounds, for inorganic compounds, per se.

427, Coating Processes, subclasses 58+ for processes of coating electrical products.

428, Stock Material or Miscellaneous Articles, appropriate subclasses for a stock material product in the form of a single or plural layer web or sheet, especially subclasses 457+ for a nonstructural composite web or sheet including at least one layer of metal.

429, Chemistry: Electrical Current Producing Apparatus, Product and Process for fuel cells and electrochemical batteries.

439, Electrical Connectors, appropriate subclasses for an electrical connector, per se, and see subclasses 754+ for a battery post clamp type connector.

455, Telecommunications, subclass 343 for a battery or battery saving means combined with a radio receiver.

SUBCLASSES

200 This subclass is indented under the class definition. Process or apparatus directed to the conversion of heat directly to electricity.

(1) Note. A device which structure-wise could convert heat to electricity but which is intended to operate vice-versa is included herein (see subclasses 203+).

(2) Note. Subcombinations of thermal generators which are specifically designed to be used therewith (e.g., thermo-couple housings, wells, etc.) are included herein (see subclass 242).

SEE OR SEARCH CLASS:

29, Metal Working, particularly subclasses 592.1+ for methods of mechanically manufacturing electrical devices.

62, Refrigeration, subclasses 3.1+ for Peltier effect refrigeration apparatus; also, see note to Class 62 in subclass 203 below.

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, and 420, Alloys or Metallic Compositions, for thermoelectric alloys.

148, Metal Treatment, subclasses 33+ for barrier layer stock material.

204, Chemistry: Electrical and Wave Energy, subclasses 196.01 through 196.38 for object protection systems utilizing a thermoelectric battery.

250, Radiant Energy, subclasses 336.1+ for invisible radiant energy responsive electric signalling devices which detect the presence of, or measures the quantity or quality of invisible radiation and subclasses 200+ for visible radiation pyrometers including circuit structure for the generated voltage.

252, Compositions, for thermoelectric compositions particularly subclass 62.3 for barrier layer device compositions and subclasses 500+ for electrically conductive and emissive compositions.

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 53 through 56 , 108, 414, and 467-470 for such as temperature responsive devices, per se.

310, Electrical Generator or Motor Structure, subclass 306 for thermal or pyromagnetic generating devices wherein there is additional control means for the generated power current. Also, subclass 306 for thermionic device, per se, or in combination with a thermoelectric device.

322, Electricity: Single Generator Systems, subclass 2 for generating systems including thermoelectric device.

324, Electricity: Measuring and Testing, for electrical measuring devices including a thermoelectric generator.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 512+ for miscellaneous thermally effected circuits.

361, Electricity: Electrical Systems and Devices, subclasses 161+ for electric circuits for relays and electromagnets which may include a thermal battery.

373, Industrial Electric Heating Furnaces, subclasses 135+ for electric furnace with control system employing a thermoelectric generator.

374, Thermal Measuring and Testing, for a thermal battery combined with a measuring circuit, particularly subclasses 179+ for a thermocouple thermometer.

420, Alloys or Metallic Compositions, appropriate subclasses for thermoelectric alloys.

428, Stock Material or Miscellaneous Articles, subclasses 615+ for a metallic composite defined in terms of the composition of its components.

431, Combustion, subclass 80 for a thermoelectric current generator operated by a burner and having the burner controlled by the generated current.

438, Semiconductor Device Manufacturing: Process, subclasses 54+ for processes of making a thermoelectric semiconductor device.

445, Electric Lamp or Space Discharge Component or Device Manufacturing; subclasses 1+ for a miscellaneous process of making a space discharge device.

201 This subclass is indented under subclass 200. Processes .

(1) Note. All patents which claim a thermoelectric device for the class and also claim a method of making the device are placed in this subclass as a cross-reference.

202 This subclass is indented under subclass 200. Apparatus wherein nuclear energy other than that resulting from an induced nuclear reaction is used as a heat source for the generator or comprising a thermoelectric device designed to be employed as an ancillary unit in a nuclear reactor system.

(1) Note. Nuclear energy of this subclass type may be that which results from radioactive decay.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 336.1+ the detection or measurement of nuclear radiation as opposed to using such energy for generating an electric current.

376, Induced Nuclear Reactions: Processes, Systems, and Elements, for nuclear energy source systems in general; and subclasses 320+ for the combination of a nuclear reactor and direct conversion means.

203 This subclass is indented under subclass 200. Apparatus wherein the device is intended to have a current applied to it to effect a temperature change.

SEE OR SEARCH CLASS:

62, Refrigeration, subclasses 3.1+ for thermoelectric cooling devices wherein the device is more than a battery-like assemblage and contains some structure peculiar to refrigeration by Peltier effect, e.g., a current source is claimed.

204 This subclass is indented under subclass 203. Apparatus which includes means to transfer heat from one material to another.

205 This subclass is indented under subclass 200. Apparatus wherein the generator produces electric energy to do useful work.

(1) Note. Generally in a power generator the heat source is constant rather than a variable source which is to be measured.

206 This subclass is indented under subclass 205. Apparatus wherein the thermogenerator is intended to be activated by heat from the sun.

SEE OR SEARCH THIS CLASS, SUBCLASS:

213+, for radiation pyrometers.

207 This subclass is indented under subclass 205. Apparatus which includes an electrical heat source for the thermogenerator.

208 This subclass is indented under subclass 205. Apparatus which has two or more junctions of the same type (hot or cold) positioned around or partially around a single point.

SEE OR SEARCH THIS CLASS, SUBCLASS:

224+, for thermopiles in general.

209 This subclass is indented under subclass 208. Apparatus which includes two or more liquid or gas conduits having a common axis.

210 This subclass is indented under subclass 209. Apparatus wherein at least one of the conduits is to convey a liquid coolant.

211 This subclass is indented under subclass 205. Apparatus which has two or more junctions of the same type (hot or cold) positioned only in a single line.

SEE OR SEARCH THIS CLASS, SUBCLASS:
224+, for thermopiles in general.

212 This subclass is indented under subclass 205. Apparatus which has two or more junctions of the same type (hot or cold) positioned so that a common plane passes through the junctions.

SEE OR SEARCH THIS CLASS, SUBCLASS:
224+, for thermopiles in general.

213 This subclass is indented under subclass 200. Apparatus wherein the battery is to be heated substantially entirely by radiations from a body.

SEE OR SEARCH THIS CLASS, SUBCLASS:
206, for solar energy type power generators.
243+, for photoelectric primary batteries.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 336.1+ for detection of invisible radiant energy and subclasses 200+ for light responsive photocell circuits and apparatus.
374, Thermal Measuring and Testing, subclasses 121+ for such subject matter combined with a measuring circuit.

214 This subclass is indented under subclass 213. Apparatus which includes some means to cause the rays from the source to be focused or reflected to increase their strength per unit area.

215 This subclass is indented under subclass 214. Apparatus wherein the concentrator is a ray transmitting and bending lens.

216 This subclass is indented under subclass 213. Apparatus wherein the pyrometer contains a sealed space which is at substantially less than atmospheric pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223, for thermoelectric generators in general containing an evacuated space.

217 This subclass is indented under subclass 200. Apparatus which includes a control burner for heating a junction.

(1) Note. The burner merely acts as a heat source for the thermoelectric generator rather than performing general heating.

SEE OR SEARCH CLASS:
137, Fluid Handling, subclass 66 for a thermoelectric current generator controlling a valve and heated by a burner controlled by the valve.
431, Combustion, subclass 79 for a thermoelectric generator heated by a pilot burner that has a distinct orifice heating or igniting other structure.

218 This subclass is indented under subclass 217. Apparatus which includes a forced fluid means (gas or liquid) for removing heat from the cold junction of a couple.

219 This subclass is indented under subclass 217. Apparatus wherein the thermocouples or the leads thereto are surrounded by the carrier means for the pilot burner fuel.

220 This subclass is indented under subclass 217. Apparatus which includes two or more thermocouples.

SEE OR SEARCH THIS CLASS, SUBCLASS:
224, for thermopiles generally.

221 This subclass is indented under subclass 200. Apparatus which includes a means to resiliently press a sensor against a body to be sensed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
229, for a thermoelectric device which has additional contact means for sensing solid work.

222 This subclass is indented under subclass 200. Apparatus which includes a heating or cooling means for a junction of a couple which does not sense heat quantities.

223 This subclass is indented under subclass 200. Apparatus which includes a sealed space which is at substantially less than atmospheric pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
216, for evacuated radiation pyrometers.

224 This subclass is indented under subclass 200. Apparatus which includes two or more couples.

SEE OR SEARCH THIS CLASS, SUBCLASS:
208, through 212, for plural junctions in a power generator.
220, for a pilot burner type thermopile.

225 This subclass is indented under subclass 224. Apparatus wherein the thermopile is composed of plate, film or strip type thermocouples.

226 This subclass is indented under subclass 224. Apparatus wherein the thermopile is composed of a wire formed of turns around an axis.

227 This subclass is indented under subclass 224. Apparatus wherein plural couples have a composition which differs.

(1) Note. The thermopile may have one couple element common to two different couples.

228 This subclass is indented under subclass 200. Apparatus wherein one element of a couple is inside the other element of a couple.

229 This subclass is indented under subclass 200. Apparatus which includes a sensing means for transmitting or conducting qualities of a solid member in contact therewith to a thermoelectric junction.

230 This subclass is indented under subclass 200. Apparatus having a thermoelectric device which includes a housing, mounting or support.

231 This subclass is indented under subclass 230. Apparatus which housing for the thermoelectric element contains an entrance for a portion of the material the qualities of which are to be determined.

232 This subclass is indented under subclass 230. Apparatus wherein the junction of a thermoelectric member is surrounded by a covering and sealed from the immediate atmosphere.

233 This subclass is indented under subclass 232. Apparatus in which the covering is against the junction.

234 This subclass is indented under subclass 232. Apparatus wherein the thermoelectric device is to be immersed in molten metal.

SEE OR SEARCH CLASS:
374, Thermal Measuring and Testing, subclass 140 for a thermometer including a molten metal lance.

235 This subclass is indented under subclass 230. Apparatus wherein the thermocouple leads have mechanically forced, releasable, contact means for forming an electrical junction with an external circuit.

236.1 Having particular thermoelectric composition:
This subclass is indented under subclass 200. Apparatus wherein a thermoelectric composition is claimed.

(1) Note. To be placed herein rather than in a composition class, a thermoelectric device defined by composition only must claim at least two elements of the thermoelectric device, e.g., two junction elements of a couple.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 615+ for metallic composite defined in terms of the composition of its components.

237 This subclass is indented under subclass 236.1. Apparatus which includes a particular uniting composition for the elements of a couple.

238 This subclass is indented under subclass 236.1. Apparatus wherein the composition contains sulphur, oxygen, tellurium or selenium.

239 This subclass is indented under subclass 236.1. Apparatus wherein the composition contains carbon, silicon, titanium, germanium, zirconium, tin, hafnium or lead.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 641 for a metallic composite in which a component has a silicon or germanium base.

240 This subclass is indented under subclass 236.1. Apparatus wherein the composition contains vanadium, arsenic, niobium, antimony, tantalum, or bismuth.

241 This subclass is indented under subclass 236.1. Apparatus wherein the composition contains copper, silver or gold.

242 This subclass is indented under subclass 200. Apparatus directed to accessories for thermoelectric devices.

243 PHOTOELECTRIC:

This subclass is indented under the class definition. Device which generates an electric potential upon exposure to light, by the direct conversion of the light to electrical energy, i.e., photovoltaic.

(1) Note. Similar structures may be disclosed as having other functions, e.g., rectifying, photoconductive, etc., and some of these photoelectric devices may be disclosed as having several functions. A patent which discloses or claims only a photovoltaic use will be placed here. A patent which claims other uses or which is claimed generically will be placed in another pertinent class, e.g., Class 250, Radiant Energy, or Class 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes).

SEE OR SEARCH THIS CLASS, SUBCLASS:

200, for a similar device which directly converts heat to electricity.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 200+ for circuits and applications which incorporate a photoelectric cell.

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 10, 11, 21, 53-56, 72, 80-85, 113-118, 184-189, 225-234, 257, 258, 290-294, 414, and 431-466 for light responsive active semiconductor devices.

430, Radiation Imagery Chemistry: Process, Composition or Product, subclasses 57.4+ for layered electrophotographic plates containing silicon and selenium.

438, Semiconductor Device Manufacturing: Process, subclasses 57+ for processes of making a radiation responsive photovoltaic device of the semiconductor barrier layer type.

244 Panel or array:

This subclass is indented under subclass 243. A photoelectric cell combined with (a) at least one other photoelectric cell, or (b) a different electric generating means (e.g., galvanic), or (c) distinct perfecting means for the photocell (e.g., cooling means).

SEE OR SEARCH THIS CLASS, SUBCLASS:

200+, for a thermocouple which may be combined with a photocell.

245 Lightweight and collapsible or foldable:

This subclass is indented under subclass 244. Device which includes means to associate various parts or elements in a first compact arrangement for storage and/or transport and also in a second operative arrangement for accepting radiation, said device also utilizing materials and structures designed to decrease the mass or gravitational attraction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

292, for a cross-reference art collection of space or satellite applications.

246 With concentrator, orientator, reflector, or cooling means:
This subclass is indented under subclass 244. Device which includes means to intensify, direct, or redirect light rays with respect to the active elements or which includes means to lower the temperature of the device.

SEE OR SEARCH CLASS:
359, Optics: Systems (Including Communication) and Elements, for optical devices of general utility.

247 Fluorescent concentrator:
This subclass is indented under subclass 246. Device in which the light energy is absorbed and re-emitted at a different wave length by the concentrator.

248 Hybrid conversion system:
This subclass is indented under subclass 246. Device which includes at least one other source of electric energy (e.g., galvanic, etc.) or means to utilize heat energy.

(1) Note. Using the sun's rays for both heat and electric power is a hybrid system.

SEE OR SEARCH CLASS:
126, Stoves and Furnaces, subclasses 561+, 569+ and 714, for means, per se, designed to utilize the heat energy of the sun.

249 Monolithic semiconductor:
This subclass is indented under subclass 244. Device in which the same semiconductor layer is common to two or more individual cells.

250 Particulate or spherical semiconductor:
This subclass is indented under subclass 244. Device in which the semiconductor exists is a state of fine subdivision or is in the shape of a sphere.

251 Encapsulated or with housing:
This subclass is indented under subclass 244. Device in which the photocells are embedded in one fluent, but now solidified material or are contained within a framework.

252 Cell:
This subclass is indented under subclass 243. Device directed to the details of an individual cell and/or associated perfecting or enabling elements.

253 Radioactive, ionic, or thermo photo:
This subclass is indented under subclass 252. Photocell in which the light which generates the photovoltaic effect is produced by radio activity, ions, or heat (e.g., scintillation or incandescence, etc.).

254 Photoemissive, capacitive, magnetic, or ferroelectric:
This subclass is indented under subclass 252. Device in which the light (a) causes emission of electrons from a cathode, (b) alters the capacitance, (c) acts in a magnetic field, or (d) utilizes the ferroelectric property of said device.

255 Shottky, graded doping, plural junction or special junction geometry:
This subclass is indented under subclass 252. Device which includes a free metal semiconductor junction, more than one junction or a junction claimed in terms or specific shape or dimensions.

256 Contact, coating, or surface geometry:
This subclass is indented under subclass 252. Device in which the claims recite the material, size or configuration of a contact, a covering film or the surface of the photocell.

257 Luminescent layer or optical filter:
This subclass is indented under subclass 256. Device in which a coating has the property of absorbing light of selected frequency or of re-emitting absorbed light.

SEE OR SEARCH THIS CLASS, SUBCLASS:
247, for a photocell with a fluorescent concentrator.

258 Polycrystalline or amorphous semiconductor:
This subclass is indented under subclass 252. Device in which the semiconductor material is claimed or solely disclosed as being polycrystalline or amorphous.

259 **With concentrator, housing, cooling means, or encapsulated:**
This subclass is indented under subclass 252. Device in which the photocell is embedded in once fluid, but now solidified, material or is contained within a framework or includes means to lower the temperature of the device or means to intensify the light.

260 **Cadmium containing:**
This subclass is indented under subclass 252. Device in which an active layer includes a cadmium compound.

261 **Silicon or germanium containing:**
This subclass is indented under subclass 252. Device in which an active layer includes silicon or a silicon or germanium compound.

262 **Gallium containing:**
This subclass is indented under subclass 252. Device in which an active layer includes a compound of gallium.

263 **Organic active material containing:**
This subclass is indented under subclass 252. Device in which an active layer includes a carbon compound classifiable in Class 260, Chemistry of Carbon Compounds or the Class 532 - 570 series, Organic Compounds.

264 **Selenium or tellurium containing:**
This subclass is indented under subclass 252. Device in which an active layer contains either selenium or tellurium as an element or an inorganic compound.

265 **Copper, lead, or zinc containing:**
This subclass is indented under subclass 252. Device in which an active layer includes an inorganic compound of copper, lead, or zinc.

CROSS-REFERENCE ART COLLECTIONS

290 **TESTING, CALIBRATING, TREATING (E.G., AGING, ETC.):**
A collection of art disclosing methods of checking, adjusting, modifying and/or perfecting photovoltaic cells.

291 **APPLICATIONS:**
A collection of art disclosing methods of using or apparatus incorporating photovoltaic cells.

292 **Space-satellite:**
This subclass is indented under subclass 291. A collection of art in which the use or apparatus involves space or satellites.

293 **Circuits:**
This subclass is indented under subclass 291. A collection including details of electrical circuits.

END